



## Effect of Active Learning Start with a Question Model on Student Learning Outcome at State High School

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# Effect of Active Learning Start with a Question Model on Students' Learning Outcomes at State High School

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**Abstract.** The curriculum requires teachers to use a learning model that actively involves students. There are many active learning models, one of which is the Active Learning Model Start with a Question. The purpose of this study is to report the effect of the Active Learning Start with a Question model on students' learning outcomes at the State High School in Palu, based on sex. The study used a 2x2 factorial experimental posttest design. Active Learning Start with a Question was used in the experimental group and direct model learning in the control one. 62 students were involved in the research. The results showed that there was a significant effect of Active Learning Start with a Question model on students' learning outcomes with an average score of 61.80 while the direct learning model was 37.11. It was also shown that there is no significant difference in the students' learning outcomes with Active Learning Start with a Question model-based sex.

## 1. Introduction

One of several factors that influence students' learning outcomes in the classroom is the learning model and method applied by teachers. Through the learning model, teachers can help students get information, ideas, skills, ways of thinking, and expressing ideas. The learning model also serves as a guide for teachers in planning teaching and learning activities. The dominant learning model applied by teachers in the implementation of learning at schools is the teacher centered learning model. One of the models is the direct learning model. Learning activities in the direct learning model are dominated by the teacher, by delivering a lot of material or presentation, students are required to understand all the material presented by teacher and then apply it to a situation that is almost the same. Student's activities in learning is an imitating process of lessons delivered by teacher, not the findings of students [1].

Mathematics learning in the 2013 curriculum emphasizes a change-oriented approach and introduces the importance of involving students in utilizing mathematics through a process. As advocated by advocates of change in the mathematics education movement, mathematics learning should no longer focus on the attainment of routine skills but rather on the development of adaptive skills. Routine skills are the ability to do school math assignments quickly and accurately using standard strategies taught in school without understanding. Meanwhile, adaptive skills refer to the ability to solve mathematical tasks efficiently, creatively, and flexibly with different and meaningful solving strategies.

In the 2013 curriculum, students are expected to be more involved in learning than teachers [2]. Students must be actively involved in observing, understanding, asking, investigating, and communicating subject matter [3]. Students who are directly involved in these activities will increase their critical thinking skills and creative thinking skills so that students will be easier to understand lessons and learning outcomes will last a long time [4].

Silbermann [5] introduced an active learning strategy named active learning start with a question. This active learning model emphasizes on the ability of students to read and understand lessons through teaching materials provided by the teacher. Students can discuss with their classmates and then ask the teacher for material that is not understood by writing questions on a piece of paper that will be given to the teacher. In addition, this model can also improve students' communication skills because teachers can provide opportunities for students to answer questions posed by other students [6].

In conducting out learning, a teacher must also pay attention to the characteristics of the students he or she or she teaches. The characteristics of the students in question are the way students learn, the level of intelligence, learning styles and sex of students. Students at the age of 12 to 15 years will experience physical and psychological changes. Students at that age are classified as teenagers. This research aims to 1) determine the effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu, and 2) find out the differences of learning outcomes of seventh grade students of SMP Negeri 1 Palu who are taught using the Active Learning Start with a Question model based on male and female.

## 2. Method

The research that has been carried out is an experimental study with a 2 x 2 factorial design. The research population is 350 students of seventh grade students of SMP Negeri 1 Palu which is divided into eleven classes. The research sample was 62 people who were split into two classes, namely 1 experimental class and 1 control class. The experimental class consisted of 15 male students and 17 female students. While the control class consisted of 14 male students and 16 female students.

The data collected are: 1) the learning outcomes of seventh grade students of SMP Negeri 1 Palu, both students who follow the *Active Learning Start with a Question* model and students who follow the direct model of learning, 2) sex, namely male and female and 3) data implementation of learning. The data on students' learning outcomes of seventh grade students of SMP Negeri 1 Palu was collected using a test technique, sex data was collected using document techniques, data on learning implementation was collected using observation techniques.

The data obtained were analyzed using descriptive statistical analysis technique and inferential statistics. The descriptive statistics used are the mean, maximum value, minimum value, and standard deviation. Meanwhile, to test the research hypotheses used prerequisite test analysis, namely normality test and homogeneity test, while the research hypothesis used t test.

## 3. Results and Discussion

The results achieved from this study consisted of data about the sex of students, data on the implementation of the learning model used in the classroom and the data on students' learning outcomes. Each of these data and the results of the analysis are described in detail as follows.

### 3.1. The Result of Observation of Learning Implementation

Observation of the implementation of learning are carried out by partner teachers and field workers. The result of observation of the researcher's activities while being a teacher in both classes were recorded using the teacher's activity observation sheet. The results of the observer's observations on learning in the experimental class, the teacher's activity was categorized as very good, while the results of the student activity were categorized as good.

In addition to the experimental class, the control class was also observed to see the implementation of the learning steps that have been planned in the lesson plan. Based on the observer's observations on learning in the control class, the teacher's activities were categorized as good, while the student activities were also categorized as good.

### 3.2. Students' learning outcomes

After completing four meetings of learning, the researcher administered tests to the experimental and control classes students whose results were as shown in Table 1.

Table 1. Results of Data Analysis of Student Learning Outcomes

Statistic	Experiment Class	Control Class
N	32	30
Maximum value	100.00	86.67
Minimum value	21.12	6.67
Average	61.80	37.11
Standard deviation	23.53	18.91

Based on Table 1, it can be said that the learning outcomes of students' participating in learning in experimental class are better than the learning outcomes of students' participating in learning in control class. The results of the calculation of the average value of the experimental class are 61.80 with a standard deviation of 23.53, while the average value of the control class is 37.11 with a standard deviation of 18.91.

To find out the results of descriptive statistical analysis of learning outcomes data based on the sex of the experimental class, it can be seen in Table 2.

Table 2. Results of Data Analysis of Experimental Class Students' Learning Outcomes by Sex

Statistic	Sex	
	Male	Female
n <sub>1</sub>	15	17
Maximum value	100.00	97.06
Minimum value	29.41	21.12
Average	63.72	60.10
Standard deviation	23.57	24.08

Based on Table 2, it can be said that there are differences in the learning outcomes of male and female students. The highest score of male students' learning outcomes was 100.00, while female students were 97.06. The average learning outcomes of male students are 63.72 while female students are 60.10. The standard deviation of student learning outcomes for male students is 23.57 while female students are 24.08.

To find out students' learning outcomes in the control class by sex, it can be seen in Table 3.

Table 3. Results of Data Analysis of Control Class Students' Learning Outcomes by Sex

Statistic	Sex	
	Male	Female
n <sub>2</sub>	14	16
Maximum value	86.67	86.67
Minimum value	6.67	6.67
Average	35.24	37.08
Standard deviation	19.64	19.01

Based on Table 3, it can be said that there are similarities in the learning outcomes of male and female students in direct learning model. The highest score obtained by male students was 86.67 (scale 0 - 100) the same as the score of female students 86.67. The minimum score for male students is 6.67 the same as the minimum score for female students is 6.67. Although there are similarities in these values, it is found that there are differences in the average value of male students' learning outcomes of 35.24 while female students are 37.08. The standard deviation of students' learning outcomes for male students is 19.64 while female students is 19.01.

### 3.3. Normality and Homogeneity Test

The normality test aims to see whether the data obtained are normally distributed or not. To assist the calculations used SPSS application program. The results of the data normality test for the experimental class and control class can be seen in Table 4.

Table 4. Summary of Normality Test Results of Learning Outcome Data

Statistic	Experiment Class	Control Class
N	32	30
Test Statistic	0.15	0.16
Asymp. Sig. (2-tailed)	0.08	0.06
Conclusion	Normal	Normal

Based on Table 4, the results of calculation using the Kolmogorov-Smirnov test were obtained for the experimental class  $\text{asymp.sig} = 0.08$  while the control class  $\text{asymp.sig} = 0.06$ . Both  $\text{asymp.sig}$  are greater than 0.05 so the null hypothesis is accepted. The conclusion is that the data on students' learning outcomes in the experimental class and the control class are normally distributed.

The results of calculations using Levene statistics obtained a significance of 0.08. The significance value is greater than the alpha value of 0.05, this indicates that the  $H_0$  hypothesis is accepted. This means that the data significantly in both samples significantly have the same variance, so that the two samples are homogeneous.

### 3.4. Research Hypothesis Test

There are five hypotheses proposed in experimental research that have been carried out, which the results as follows.

- a. The hypothesis testing shows that there is an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu. Based on the calculation results of sig. (2-tailed) obtained the number 0.000 for the assumption of the same variance. The number  $0.000 < 0.05$  resulted in the  $H_0$  hypothesis is rejected. So the hypothesis  $H_1$  which states that there are differences between students' learning outcomes who follow the active learning model start with a question and students who follow the direct learning model can be accepted significantly. So there is an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu.
- b. The hypothesis testing shows that there is an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu based on male sex. Based on the calculation results obtained sig. (2-tailed) 0.03, assuming the same variance. This shows that  $H_0$  is rejected, meaning that the average learning outcomes of male students in the experimental class differ significantly from the learning outcomes of male students in the control class. So it is concluded that there is an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu based on male sex.
- c. The test has the effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu based on female sex. Based on the calculation obtained sig. (2-tailed) 0.05 assuming the same variance. This shows that  $H_0$  is accepted, meaning that there is no difference in the learning outcomes of female students in the experimental class with the learning outcomes of female students in the control class. So it is concluded that there was no effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu based on female sex.
- d. The hypothesis testing shows that there is a difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model based on male and female sex. Based on the calculation results obtained sig. (2-tailed) 0.671 assuming the same variance. This shows that  $H_0$  is accepted, meaning that the average learning outcomes of male and female students are

significantly the same or there is no difference in the average learning outcomes of male and female students in classes that follow the active learning model start with a question.

- e. Test the hypothesis that there is a difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the direct learning model based on male and female sex based on the calculation results obtained sig. (2-tailed) 0.992 assuming the same variance. This shows that  $H_0$  is accepted, meaning that the average learning outcomes of male and female students are significantly the same. In other words, there is no difference in the average learning outcomes of male and female students in classes taught using the direct learning model.

Based on the research results obtained, it shows that the average learning outcomes seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model is 61.80 while the average learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the direct learning model amounted to 37.11. These results indicate that there are differences in the learning outcomes of students who follow the active learning model start with a question with students who follow the direct learning model. These results indicate that the learning outcomes of students who follow the active learning model start with a question are better than the learning outcomes of students who follow the direct model of learning. The results of hypothesis testing obtained  $t = 4.54$  and a significance of 0.0001 so that  $H_0$  is rejected. So, the research hypothesis can be accepted which states that there is an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu.

The results of this research are in line with the results of Antiti and Usman's research [7] which states that the learning outcomes of students who are taught using the active learning model of learning start with a question are significantly higher than the learning outcomes of students who are taught using conventional learning models. The results of the hypothesis test of the research which stated that there was an effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu were also in line with the research results of Rahmawati, Rusdi and Hanifah [8] which stated that the application of the *Active Learning Start with a Question* model with a scientific approach assisted by handouts can improve students' learning activities on the subject of quadrilaterals and triangles. Meanwhile, Nelson and Crow [9] stated that active learning can improve students' thinking skills.

If it is explored more deeply about students' learning outcomes, it is also found that the average of students' learning outcomes of seventh grade students of SMP Negeri 1 Palu who are male who take part in the *Active Learning Start with a Question* model are 63.72 while the average of students' learning outcomes of seventh grade students of SMP Negeri 1 Palu, the male sex who followed the direct learning model, was 37.16. These results indicate that the learning outcomes of male students who follow the active learning model start with a question are better than the learning outcomes of students who follow the direct learning model.

The high learning outcomes of students who take part in the *Active Learning Start with a Question* model are caused by the activeness of students in learning. The potentials of students can be developed by several activities that involve students, such as asking students to ask questions, asking students to answer questions posed by other students and the interaction between students in groups [5, 10]. This is in accordance with Demirci [11] which states that active learning is a teaching and learning strategy that can develop students' skills in solving problems using critical thinking patterns.

Furthermore, the average of female students' learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model of 60.10. The result is higher than the average learning outcomes of female students who follow the direct learning model which is only 37.08. Statistically descriptive, there are differences in students' learning outcomes who take the *Active Learning Start with a Question* model with the direct learning model, only the results of inferential statistical analysis show something else, namely  $t$  count = 3.034 and  $\text{sig} = 0.05$  so  $H_0$  is accepted so that there is no significant difference in results. Students who follow the *Active Learning Start with a Question* model with students who follow the direct learning model based on female sex.

Based on the research result, it was found that the average learning outcomes of male students who took part in the *Active Learning Start with a Question* model were 63.72. This result is higher than the average learning outcomes of female students who follow the *Active Learning Start with a Question* model of 60.10, although there are differences descriptively but the results of hypothesis testing indicate that there is no significant difference in student learning outcomes of seventh grade students of SMP Negeri 1 Palu who followed the *Active Learning Start with a Question* model were male and female. Sex differences have no effect on student learning outcomes who follow the *Active Learning Start with a Question* model. This result is in accordance with the results of research by Fawaiz [12] which states that there is no difference in scientific reasoning skills between male and female students. Hayudiyani [13] also stated that there are differences in critical thinking between students who have high and low initial abilities. However, there is no difference in critical thinking between male and female students.

The same thing was obtained in the control class (direct learning model class). The average of students' learning outcomes of seventh grade students of SMP Negeri 1 Palu who followed the direct learning model for the male sex was 37.16, while the average of students' learning outcome for the female was 37.08. Although there is a difference in the average of students' learning outcomes, the results of inferential statistical analysis show that there is no significant difference in the learning outcomes seventh grade students of SMP Negeri 1 Palu who follow the direct learning model based on male and female. These results are in line with the results of Saputro [14] which states that there is no influence of sex on mathematics learning outcomes in learning using the Mind Mapping method. So, sex differences do not have a different impact either on students' learning outcomes who follow the direct learning model or follow the Mind Mapping method.

#### 4. Conclusion

Based on the results achieved, some conclusions can be drawn as follows.

1. There is a significant effect of the *Active Learning Start with a Question* model on the learning outcomes of seventh grade students of SMP Negeri 1 Palu with an average score of 61.80 while the direct learning model is 37.11.
2. There is a significant difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model with the results of students who follow the direct learning model based on male sex. The average learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model is 63.72 while students who follow the direct learning model are 37.16.
3. There is no significant difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model with the results of students who follow the direct learning model based on female sex. The average learning outcomes of female students who follow the *Active Learning Start with a Question* model is 60.10 while female students who follow the direct learning model are 37.08.
4. There is no significant difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the *Active Learning Start with a Question* model based on male and female sex.

5. There is no difference in the learning outcomes of seventh grade students of SMP Negeri 1 Palu who follow the direct learning model based on male and female sex.

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